

DOE New Particle Formation (NPF)

Working Group Members

<u>Name</u>	<u>Affiliation</u>
Cynthia Atherton	Lawrence Livermore Lab
Lin-Seok Chang	BNL
Fred Eisele	NCAR
Jerome Fast	PNL
Barbara Finlayson-Pitts	UC Irvine
Jose Jimenez	UC Boulder
Chuck Kolb	Aerodyne
Sasha Madronich	NCAR
Bob McGraw	BNL
<i>Peter McMurry, Chair</i>	U. Minnesota
William J. Shaw	PNL
Jim Smith	NCAR
Doug Worsnop	Aerodyne
Doug Wright	BNL
Rahul Zaveri	PNL
Renyi Zhang	Texas A&M
Jun Zheng	Texas A&M

International NPF Working Group

- ◆ Markku Kulmala and Peter McMurry, co-chairs
- ◆ First Meeting: Hyytiälä, Finland, Aug. 15-17, 2005
50 participants from Austria (1), Belgium (1), Czech Republic (1), Estonia (2), Finland (18), Germany (6), Ireland (1), Italy (2), South Africa (1), Sweden (3), Switzerland (1), UK (4) and US (9)
- ◆ Second Meeting: Minneapolis, MN, Sept. 9-10, 2006
 - For Abstract book see: <http://www.me.umn.edu/aerosol/>
- ◆ Third Meeting: ICNAA, Galway, Ireland, Aug 13-17, 2007

DOE NPF : Instrumentation

◆ *Deliverables*

- Thermal Desorption Chemical Ionization Mass Spectrometer (TDCIMS) for measuring composition of nanoparticles down to ~6 nm
 - » Organics, inorganics (NCAR/UMN team)

◆ *Future Needs*

- Nucleating species in addition to H_2SO_4
- Molecular clusters, smaller particles
- Etc.

DOE NPF Deliverables: Process Models for New Particle Formation and Growth Rates

- ◆ Parametrized expressions for *NPF Rates*
 - *Empirical*: Sensitivity to $[H_2SO_4]$, organic acids, ions, $[NH_3]$, preexisting aerosol, etc. (UMN/NCAR)
 - *Deterministic*: (McGraw), Laboratory & atmospheric measurements (R. Zhang, Finlayson-Pitts, McMurry)
- ◆ *Growth rates* of freshly nucleated nanoparticles (NCAR/UMN team; Aerodyne)
 - *Empirical*: Seasonal and diurnal dependence by region
 - *Deterministic*: Contributions of H_2SO_4 & organics

Short term focus: Empirical Microphysical models that can be used by regional modelers

DOE NPF Deliverables: Improve Treatment of NPF and Growth in Chemical Transport Models for Aerosols

- ◆ Atherton, Fast, Wright, Madronich
 - Number concentrations (NPF Rate)
 - Mean size (growth rate) and size distribution

Lessons learned from atmospheric observations (empirical microphysical models) will be incorporated.

DOE NPF Deliverables: Atmospheric Observations

◆ Recent Field Study Locations

- Boulder, CO (2005-2006)
- Mexico City (2006)
- Niwot Ridge (forest impact) (NCAR) (2006)

◆ Thoughts about Future Field Studies

- Contrast NPF & Growth processes in urban and biogenic regions
- Study vertical distributions: Forest and urban “canopies”
- NCAR 2007: Focus on use of new measurement methods
- East LA Basin: Trans-soberol exploratory study
- NPF components to WACEE, CARE, BAP, etc.
- Suggestion: Use EPA Supersite city (infrastructure & knowledge)